

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

WHAT IS CLAIMED IS:

1        1.    A process for preparing a product comprising  
2    branched olefins, said process comprising:

3        hydrocracking and hydroisomerizing a paraffinic wax  
4        to produce an isoparaffinic composition  
5        comprising 0.5% or less quaternary carbon  
6        atoms, said isoparaffinic composition  
7        comprising paraffins having a carbon number of  
8        from about 7 to about 18, at least a portion of  
9        said paraffins being branched paraffins  
10       comprising an average number of branches per  
11       paraffin molecule of at least 0.5, said  
12       branches comprising a first number of methyl  
13       branches and optionally a second number of  
14       ethyl branches;

15       exposing said isoparaffinic composition to a  
16       dehydrogenation catalyst in an amount and under  
17       dehydrogenation conditions effective to  
18       dehydrogenate said branched paraffins and to  
19       produce said branched olefins comprising 0.5%  
20       or less quaternary aliphatic carbon atoms.

1       2.    The process of claim 1 wherein said  
2    isoparaffinic composition and said branched olefins  
3    comprise 0.3% or less quaternary aliphatic carbon atoms.

1       3.    The process of claim 1 wherein said  
2    isoparaffinic composition comprises at least about 50 %w  
3    of said branched paraffins.

1       4.    The process of claim 1 wherein at least 75 %w  
2    of said branched paraffins comprise a range of molecules  
3    of which the heaviest molecules comprises at most 6  
4    carbon atoms more than the lightest molecules.

1       5.    The process of claim 1 wherein at least 90 %w  
2    of said branched paraffins comprise a range of molecules

3 of which the heaviest molecules comprises at most 6  
4 carbon atoms more than the lightest molecules.

1 6. The process of claim 1 wherein said paraffins  
2 have a carbon number in the range of from 7 to 35.

1 7. The process of claim 1 wherein at least 75%w of  
2 said isoparaffinic composition consists of paraffins  
3 having a carbon number in the range of from 10 to 18.

1 8. The process of claim 1 wherein at least 90 w%  
2 of said isoparaffinic composition consists of paraffins  
3 having a carbon number in the range of from 10 to 18.

1 9. The process of claim 1 wherein at least 75%w of  
2 said isoparaffinic composition consists of paraffins  
3 having a carbon number in the range of from 11 to 14.

1 10. The process of claim 1 wherein at least 90%w of  
2 said isoparaffinic composition consists of paraffins  
3 having a carbon number in the range of from 11 to 14.

1 11. The process of claim 1 wherein said average  
2 number of branches is at least 0.7.

1 12. The process of claim 1 wherein said average  
2 number of branches is at most 2.0.

1 13. The process of claim 1 wherein said average  
2 number of branches is at most 1.8.

1 14. The process of claim 1 wherein said average  
2 number of branches is at most 1.4.

1 15. The process of claim 1 wherein said first  
2 number of methyl branches is at least 50%.

1 16. The process of claim 1 wherein said second  
2 number of ethyl branches is at most 10%.

1 17. A process for preparing a product comprising  
2 branched olefins, said process comprising:

3 hydrocracking and hydroisomerizing a paraffinic wax  
4 to produce an isoparaffinic composition  
5 comprising less than 0.5% quaternary aliphatic  
6 carbon atoms, said isoparaffinic composition

7 comprising paraffins having a carbon number of  
8 from about 7 to about 18, at least a portion of  
9 said paraffins being branched paraffins  
10 comprising an average number of branches per  
11 paraffin molecule of at least 0.5, said  
12 branches comprising a first number of methyl  
13 branches and optionally a second number of  
14 ethyl branches;and,

15 exposing said isoparaffinic composition to a  
16 dehydrogenation catalyst in an amount and under  
17 dehydrogenation conditions effective to  
18 dehydrogenate said branched paraffins and to  
19 produce said branched olefins comprising less  
20 than 0.5% quaternary aliphatic carbon atoms.

1 18. The process of claim 1 wherein said  
2 isoparaffinic composition and said branched olefins  
3 comprise 0.3% or less quaternary aliphatic carbon atoms.

1 19. The process of claim 1 wherein said  
2 isoparaffinic composition comprises at least about 50 %w  
3 of said branched paraffins.

1 20. The process of claim 1 wherein said  
2 isoparaffinic composition comprises at most 10%w linear  
3 paraffins.

1 21. The process of claim 1 wherein said  
2 isoparaffinic composition comprises at most 5%w linear  
3 paraffins.

1 22. The process of claim 1 wherein said  
2 isoparaffinic composition is produced by a Fischer  
3 Tropsch process.

1 23. The process of claim 1 wherein said  
2 isoparaffinic composition is obtained from an ethylene  
3 oligomerization process.

1 24. The process of claim 1 wherein said  
2 isoparaffinic composition is treated with an absorbent

3 under conditions effective to perform a function selected  
4 from the group consisting of reducing linear paraffin  
5 content, favorably adjusting said average number of  
6 branches, and a combination thereof.

1 25. The process of claim 1 wherein said  
2 dehydrogenation catalyst comprises a quantity of metal or  
3 metal compound selected from the group consisting of  
4 chrome oxide, iron oxide and, noble metals.

1 26. The process of claim 1 wherein said  
2 dehydrogenation catalyst comprises a quantity of noble  
3 metal selected from the group consisting of platinum,  
4 palladium, iridium, ruthenium, osmium and rhodium.

1 27. The process of claim 1 wherein said  
2 dehydrogenation catalyst comprises a quantity of noble  
3 metal selected from the group consisting of palladium and  
4 platinum.

1 28. The process of claim 1 wherein said  
2 dehydrogenation catalyst comprises a quantity of  
3 platinum.

1 29. The process of claim 25 wherein said  
2 dehydrogenation catalyst further comprises a porous  
3 support selected from the group consisting of activated  
4 carbon; coke; charcoal; silica; silica gel; synthetic  
5 clays; and silicates.

1 30. The process of claim 25 wherein said  
2 dehydrogenation catalyst further comprises a porous  
3 support selected from the group consisting of gamma  
4 alumina or eta alumina.

1 31. The process of claim 25 where said quantity of  
2 metal or metal compound is from about 0.01 to 5%w based  
3 on the weight of the catalyst.

1 32. The process of claim 26 wherein said catalyst  
2 further comprises from about 0.01 to about 5%w of one or  
3 more metals selected from the group consisting of Group

4 3a, Group 4a and Group 5a of the Periodic Table of  
5 Elements.

1 33. The process of claim 26 wherein said catalyst  
2 further comprises from about 0.01 to about 5%w of one or  
3 more metals selected from the group consisting of alkali  
4 earth metals and alkaline earth metals.

1 34. The process of claim 26 wherein said catalyst  
2 further comprises from about 0.01 to about 5%w of one or  
3 more metals selected from the group consisting of indium,  
4 tin, bismuth, potassium, and lithium.

1 35. The process of claim 26 wherein said catalyst  
2 further comprises from about 0.01 to about 5%w of one or  
3 more halogens.

1 36. The process of claim 26 wherein said catalyst  
2 further comprises from about 0.01 to about 5%w  
3 independently of tin and chlorine.

1 37. The process of claim 1 wherein said catalyst is  
2 selected from the group consisting of chrome oxide on  
3 gamma alumina, platinum on gamma alumina, palladium on  
4 gamma alumina, platinum/lithium on gamma alumina,  
5 platinum/potassium on gamma alumina, platinum/tin on  
6 gamma alumina, platinum/tin on hydrotalcite,  
7 platinum/indium on gamma alumina and platinum/bismuth on  
8 gamma alumina.

1 38. The process of claim 1 wherein said  
2 dehydrogenation conditions comprise a temperature of from  
3 about 300°C to about 700 °C. and a pressure of from about  
4 1.1 to 15 bar absolute.

1 39. The process of claim 1 wherein hydrogen is fed  
2 to said dehydrogenation catalyst with said isoparaffinic  
3 composition.

1 40. The process of claim 39 wherein said hydrogen  
2 and said paraffins are fed at a molar ratio of from about  
3 0.1 to about 20.

1 41. The process of claim 1 wherein said  
2 dehydrogenation conditions comprise a residence time  
3 effective to maintain a conversion level of said  
4 isoparaaffinic composition below about 50 mole%.

1 42. The process of claim 1 wherein said branched  
2 olefins comprise non-converted paraffins and said process  
3 further comprises separating said non-converted paraffins  
4 from said branched olefin product and recycling said non-  
5 converted paraffins to said dehydrogenation catalyst.

1 43. The process of claim 42 wherein said separating  
2 comprises exposing said product comprising non-converted  
3 paraffins to molecular sieves.

1 44. The process of claim 43 wherein said molecular  
2 sieves are zeolites.

1 45. The process of claim 1 wherein said branched  
2 olefin product comprises from about 1 to about 50% mole  
3 olefins relative to the total number of moles of olefins  
4 and paraffins present.

1 46. The process of claim 1 wherein said branched  
2 olefin product comprises from about 10 to about 20% mole  
3 olefins relative to the total number of moles of olefins  
4 and paraffins present in said product.

1 47. A process for preparing branched alkyl aromatic  
2 hydrocarbons comprising:

3 hydrocracking and hydroisomerizing a paraaffinic wax  
4 to produce an isoparaaffinic composition  
5 comprising 0.5% or less quaternary carbon  
6 atoms, said isoparaaffinic composition  
7 comprising paraffins having a carbon number of  
8 from about 7 to about 18, at least a portion of  
9 said paraffins being branched paraffins  
10 comprising an average number of branches per  
11 paraffin molecule of at least 0.5, said  
12 branches comprising a first number of methyl

13           branches and optionally a second number of  
14           ethyl branches;  
15       exposing said isoparaffinic composition to a  
16           dehydrogenation catalyst in an amount and under  
17           dehydrogenation conditions effective to  
18           dehydrogenate said branched paraffins and to  
19           produce a mixture comprising branched olefins  
20           comprising 0.5% or less quaternary carbon atoms  
21           and non-converted paraffins;  
22       contacting said branched olefins with an aromatic  
23           hydrocarbon in the presence of a quantity of an  
24           alkylation catalyst under alkylation conditions  
25           effective to alkylate said aromatic  
26           hydrocarbon, producing said branched alkyl  
27           aromatic hydrocarbons.

1       48. The process of claim 47 wherein said aromatic  
2       hydrocarbon is selected from the group consisting of one  
3       or more of benzenes, toluenes, xylenes, and naphthalenes.

1       49. A process as claimed in claim 47 wherein said  
2       aromatic hydrocarbon is benzene.

1       50. The process of claim 47 wherein said alkylation  
2       conditions are effective to predominately monoalkylate  
3       said aromatic hydrocarbon.

1       51. The process of claim 47 wherein said alkylation  
2       conditions comprise a molar ratio of said branched  
3       olefins to said aromatic hydrocarbons of at least about  
4       0.5.

1       52. The process of claim 47 wherein said alkylation  
2       conditions comprise a molar ratio of said branched  
3       olefins to said aromatic hydrocarbons of at least about  
4       1.

1       53. The process of claim 47 wherein said alkylation  
2       conditions comprise a molar ratio of said branched



3 olefins to said aromatic hydrocarbons of at least about  
4 1.5.

1 54. The process of claim 47 wherein said conditions  
2 comprise a liquid diluent selected from the group  
3 consisting of an excess of said aromatic hydrocarbon and  
4 paraffin mixtures having a boiling range substantially  
5 the same as said non-converted paraffins.

1 55. The process of claim 47 wherein said alkylation  
2 catalyst is selected from the group consisting of  
3 zeolites comprising pores having pore size dimensions of  
4 from about 4 to about 9 Å.

1 56. The process of claim 55 wherein said alkylation  
2 catalyst comprises one or more zeolites in acidic form  
3 selected from the group consisting of zeolite Y, ZSM-5,  
4 ZSM-11, and zeolites having an NES zeolite structure  
5 type.

1 57. The process of claim 55 wherein said alkylation  
2 catalyst comprises one or more zeolites in acidic form  
3 selected from the group consisting of mordenite, ZSM-4,  
4 ZSM-12, ZSM-20, offretite, gemelinite and cancrinite.

1 58. The process of claim 55 wherein said alkylation  
2 catalyst comprises one or more zeolites having an  
3 isotypic framework structure selected from the group  
4 consisting of NU-87 and gottardiite.

1 59. The process of claim 55 wherein said zeolites  
2 have a framework molar ratio of Si to Al of from about  
3 5:1 to about 100:1.

1 60. The process of claim 55 wherein said zeolite  
2 has said NES zeolite structure type and comprises a  
3 framework molar ratio of Si to Al of from about 5:1 to  
4 about 25:1.

1 61. The process of claim 60 wherein said framework  
2 molar ratio is from about 10:1 to about 20:1.

1        62. The process of claim 55 wherein said zeolites  
2        comprise cationic sites, at least a portion of said  
3        cationic sites being occupied by replacing ions selected  
4        from the group other than alkali metal ions and alkaline  
5        earth metal ions.

1        63. The process of claim 62 wherein said replacing  
2        ions are selected from the group consisting of ammonium,  
3        hydrogen, rare earth metals, and combinations thereof.

1        64. The process of claim 62 wherein at least 50% of  
2        cationic sites on said zeolites are in hydrogen form.

1        65. The process of claim 62 wherein at least 90% of  
2        cationic sites on said zeolites are in hydrogen form.

1        66. The process of claim 55 wherein said alkylation  
2        catalyst comprises pellets comprising at least 50 %w, of  
3        said zeolite.

1        67. The process of claim 47 wherein said quantity  
2        of said alkylation catalyst is from about 1 to about 50%w  
3        relative to the weight of said branched olefins in said  
4        mixture.

1        68. The process of claim 47 wherein said alkylation  
2        conditions comprise a reaction temperature of from about  
3        30°C to about 300 °C.

1        69. The process of claim 47 wherein said  
2        isoparaffinic composition comprises at least about 50 %w  
3        of said branched paraffins.

1        70. The process of claim 47 wherein said first  
2        number of methyl branches is at least about 50% of said  
3        branches.

1        71. The process of claim 47 wherein at least 75 %w  
2        of said branched paraffins represent a range of molecules  
3        of which the heaviest molecules comprise at most 6 carbon  
4        atoms more than the lightest molecules.

1 72. The process of claim 47 wherein said  
2 isoparaffinic composition comprises paraffins having a  
3 carbon number in the range of from 7 to 35.

1 73. The process of claim 47 wherein at least 75%w  
2 of said isoparaffinic composition consists of paraffins  
3 having a carbon number in the range of from 10 to 18.

1 74. The process of claim 47 wherein at least 75%w  
2 of said isoparaffinic composition consists of paraffins  
3 having a carbon number in the range of from 11 to 14.

1 75. The process of claim 47 wherein said average  
2 number of branches is at least 0.7.

1 76. The process of claim 47 wherein said average  
2 number of branches is at most 2.0.

1 77. The process of claim 47 wherein said average  
2 number of branches is at most 1.8.

1 78. The process of claim 47 wherein said first  
2 number of methyl branches is at least 50% of said  
3 branches.

1 79. A process for preparing branched alkyl aromatic  
2 hydrocarbons comprising:

3 hydrocracking and hydroisomerizing a paraffinic wax  
4 to produce an isoparaffinic composition  
5 comprising 0.5% or less quaternary aliphatic  
6 carbon atoms, said isoparaffinic composition  
7 comprising paraffins having a carbon number of  
8 from about 7 to about 18, at least a portion of  
9 said paraffins being branched paraffins  
10 comprising an average number of branches per  
11 paraffin molecule of at least 0.5, said  
12 branches comprising a first number of methyl  
13 branches and optionally a second number of  
14 ethyl branches;

15 exposing said isoparaffinic composition to a  
16 dehydrogenation catalyst in an amount and under

17 dehydrogenation conditions effective to  
18 dehydrogenate said branched paraffins and to  
19 produce a mixture comprising unconverted  
20 paraffins and branched olefins comprising 0.5%  
21 or less quaternary aliphatic carbon atoms; and  
22 contacting said branched olefins with an aromatic  
23 hydrocarbon in the presence of a quantity of an  
24 alkylation catalyst under alkylation conditions  
25 effective to alkylate said aromatic  
26 hydrocarbon, producing said branched alkyl  
27 aromatic hydrocarbons.

1 80. The process of claim 79 wherein 0.3% or less of  
2 carbon atoms present in said isoparaffinic composition  
3 comprise quaternary aliphatic carbon atoms.

1 81. The process of claim 79 wherein at least 50 %w  
2 of said isoparaffinic composition is said branched  
3 paraffins.

1 82. The process of claim 79 wherein at most 10 %w  
2 of said isoparaffinic composition is said linear  
3 paraffins.

1 83. The process of claim 79 wherein at most 5 %w of  
2 said isoparaffinic composition is said linear paraffins.

1 84. The process of claim 79 wherein at most 1 %w of  
2 said isoparaffinic composition is said linear paraffins.

1 85. The process of claim 79 wherein said  
2 isoparaffinic composition is produced by a Fischer  
3 Tropsch process.

1 86. The process of claim 79 wherein said  
2 isoparaffinic composition is treated with an absorbent  
3 under absorbent conditions effective to perform a  
4 function selected from the group consisting of lowering  
5 linear paraffin content, favorably adjusting said average  
6 number of branches, and a combination thereof.

1 87. The process of claim 86 wherein said absorbent  
2 is a zeolite.

1 88. The process of claim 79 wherein said  
2 dehydrogenation catalyst comprises a quantity of metal or  
3 metal compound selected from the group consisting of  
4 chrome oxide, iron oxide and, noble metals.

1 89. The process of claim 88 wherein said  
2 dehydrogenation catalyst comprises a quantity of noble  
3 metal selected from the group consisting of platinum,  
4 palladium, iridium, ruthenium, osmium and rhodium.

1 90. The process of claim 88 wherein said  
2 dehydrogenation catalyst comprises a quantity of noble  
3 metal selected from the group consisting of palladium and  
4 platinum.

1 91. The process of claim 88 wherein said  
2 dehydrogenation catalyst comprises a quantity of  
3 platinum.

1 92. The process of claim 88 wherein said catalyst  
2 further comprises a porous support selected from the  
3 group consisting of gamma alumina or eta alumina.

1 93. The process of claim 88 where said quantity of  
2 metal is from about 0.01 to about 5%w based on the weight  
3 of said dehydrogenation catalyst.

1 94. The process of claim 89 wherein said  
2 dehydrogenation catalyst further comprises from about 0.01  
3 to about 5%w of one or more metals selected from the  
4 group consisting of Group 3a, Group 4a and Group 5a of  
5 the Periodic Table of Elements.

1 95. The process of claim 89 wherein said  
2 dehydrogenation catalyst further comprises from about 0.01  
3 to about 5%w of one or more metals selected from the  
4 group consisting of alkali earth metals and alkaline  
5 earth metals.

1        96. The process of claim 89 wherein said  
2 dehydrogenation catalyst further comprises from about 0.01  
3 to about 5%w of one or more metals selected from the  
4 group consisting of indium, tin, bismuth, potassium, and  
5 lithium.

1        97. The process of claim 89 wherein said  
2 dehydrogenation catalyst further comprises from about 0.01  
3 to about 5%w of one or more halogens.

1        98. The process of claim 89 wherein said  
2 dehydrogenation catalyst comprises from about 0.01 to  
3 about 5%w independently of tin and chlorine.

1        99. The process of claim 79 wherein said  
2 dehydrogenation catalyst is selected from the group  
3 consisting of chrome oxide on gamma alumina, platinum on  
4 gamma alumina, palladium on gamma alumina,  
5 platinum/lithium on gamma alumina, platinum/potassium on  
6 gamma alumina, platinum/tin on gamma alumina,  
7 platinum/tin on hydrotalcite, platinum/indium on gamma  
8 alumina and platinum/bismuth on gamma alumina.

1        100. The process of claim 79 wherein said  
2 dehydrogenation conditions comprise a temperature of from  
3 about 300°C to about 700 °C. and a pressure of from about  
4 1.1 to 15 bar absolute.

1        101. The process of claim 79 wherein hydrogen is fed  
2 to said dehydrogenation catalyst with said isoparaffinic  
3 composition.

1        102. The process of claim 101 wherein said hydrogen  
2 and said paraffins are fed at a molar ratio of from about  
3 0.1 to about 20.

1        103. The process of claim 79 wherein said  
2 dehydrogenation conditions comprise a residence time  
3 effective to maintain a conversion level of said  
4 isoparaffinic composition of about 50 mole% or less.

1 104. The process of claim 79 further comprising  
2 separating non-converted paraffins from said product and  
3 recycling said non-converted paraffins to said  
4 dehydrogenation catalyst.

1 105. The process of claim 79 wherein said product  
2 comprises from about 50% mole or less olefins relative to  
3 the total number of moles of olefins and paraffins in  
4 said product.

1 106. A process for preparing (branched-alkyl)  
2 arylsulfonates comprising:

3 hydrocracking and hydroisomerizing a paraffinic wax  
4 to produce an isoparaffinic composition  
5 comprising 0.5% or less quaternary carbon  
6 atoms, said isoparaffinic composition  
7 comprising paraffins having a carbon number of  
8 from about 7 to about 18, at least a portion of  
9 said paraffins being branched paraffins  
10 comprising an average number of branches per  
11 paraffin molecule of at least 0.5, said  
12 branches comprising a first number of methyl  
13 branches and optionally a second number of  
14 ethyl branches;

15 exposing said isoparaffinic composition to a  
16 dehydrogenation catalyst in an amount and under  
17 dehydrogenation conditions effective to  
18 dehydrogenate said branched paraffins and to  
19 produce a mixture comprising branched olefins  
20 and unconverted paraffins, said branched  
21 olefins comprising 0.5% or less quaternary  
22 carbon atoms;

23 contacting said branched olefins with an aromatic  
24 hydrocarbon in the presence of a quantity of an  
25 alkylation catalyst under alkylation conditions  
26 effective to alkylate said aromatic

27 hydrocarbon, producing branched alkyl aromatic  
28 hydrocarbons comprising 0.5% or less quaternary  
29 carbon atoms;  
30 sulfonating said branched alkyl aromatic  
31 hydrocarbons.

1 107. The process of claim 106 wherein said aromatic  
2 hydrocarbon is selected from the group consisting of one  
3 or more of benzenes, toluenes, xylenes, and naphthalenes.

1 108. The process of claim 106 wherein said aromatic  
2 hydrocarbon is benzene.

1 109. The process of claim 106 wherein said  
2 alkylation conditions are effective to predominately  
3 monoalkylate said aromatic hydrocarbon.

1 110. The process of claim 106 wherein said  
2 alkylation catalyst is selected from the group consisting  
3 of zeolites comprising pores having pore size dimensions  
4 of from about 4 to about 9 Å.

1 111. The process of claim 106 wherein said  
2 alkylation catalyst comprises one or more zeolites in  
3 acidic form selected from the group consisting of zeolite  
4 Y, ZSM-5, ZSM-11, mordenite, ZSM-4, ZSM-12, ZSM-20,  
5 offretite, gemelinite, cancrinite, and zeolites having an  
6 NES zeolite structure type.

1 112. The process of claim 106 wherein alkylation  
2 catalyst is a zeolite having an isotypic framework  
3 structure selected from the group consisting of NU-87 and  
4 gottardiite.

1 113. The process of claim 110 wherein said zeolites  
2 have a framework molar ratio of Si to Al of from about  
3 5:1 to about 100:1.

1 114. The process of claim 111 wherein said zeolite  
2 has said NES zeolite structure type and has a framework  
3 molar ratio of Si to Al of from about 5:1 to about 25:1.



1 115. The process of claim 110 wherein said zeolites  
2 comprise cationic sites, at least a portion of said  
3 cationic sites being occupied by replacing ions selected  
4 from the group other than alkali metal ions and alkaline  
5 earth metal ions.

1 116. The process of claim 115 wherein said replacing  
2 ions are selected from the group consisting of ammonium,  
3 hydrogen, rare earth metals, and combinations thereof.

1 117. The process of claim 115 wherein at least 50%  
2 of cationic sites on said zeolites are in hydrogen form.

1 118. The process of claim 115 wherein at least 90%  
2 of cationic sites on said zeolites are in hydrogen form.

1 119. The process of claim 110 wherein said  
2 alkylation catalyst comprises pellets comprising at least  
3 50 %w of said zeolite.

1 120. The process of claim 106 wherein said quantity  
2 of said alkylation catalyst is from about 1 to about 50%w  
3 relative to the weight of said branched olefins in said  
4 mixture.

1 121. The process of claim 106 wherein said  
2 isoparaffinic composition comprises at least about 50 %w  
3 branched paraffins.

1 122. The process of claim 106 wherein said first  
2 number is at least about 50% of said branches.

1 123. The process of claim 106 wherein at least 75 %w  
2 of said branched paraffins in said isoparaffinic  
3 composition represent a range of molecules of which the  
4 heaviest molecules comprises at most 6 carbon atoms more  
5 than the lightest molecules.

1 124. The process of claim 106 wherein said  
2 isoparaffinic composition comprises paraffins having a  
3 carbon number in the range of from 7 to 35.

1 125. The process of claim 106 wherein at least 75%w  
2 of said isoparaffinic composition consists of paraffins  
3 having a carbon number in the range of from 10 to 18.

1 126. The process of claim 106 wherein at least 75%w  
2 of said isoparaffinic composition consists of paraffins  
3 having a carbon number in the range of from 11 to 14.

1 127. The process of claim 106 wherein said average  
2 number of branches is at least 0.7.

1 128. The process of claim 106 wherein said average  
2 number of branches is at most 2.0.

1 129. The process of claim 106 wherein said average  
2 number of branches is at most 1.8.

1 130. The process of claim 106 wherein said first  
2 number of methyl branches is at least 50% of said  
3 branches.

1 131. The process of claim 106 wherein said second  
2 number of ethyl branches is at most 10% of said branches.

1 132. A process for preparing (branched-alkyl)  
2 arylsulfonates comprising:

3 hydrocracking and hydroisomerizing a paraffinic wax  
4 to produce an isoparaffinic composition  
5 comprising 0.5% or less quaternary aliphatic  
6 carbon atoms, said isoparaffinic composition  
7 comprising paraffins having a carbon number of  
8 from about 7 to about 18, at least a portion of  
9 said paraffins being branched paraffins  
10 comprising an average number of branches per  
11 paraffin molecule of at least 0.5, said  
12 branches comprising a first number of methyl  
13 branches and optionally a second number of  
14 ethyl branches;

15 exposing said isoparaffinic composition to a  
16 dehydrogenation catalyst in an amount and under  
17 dehydrogenation conditions effective to

18 dehydrogenate said branched paraffins and to  
19 produce a mixture comprising branched olefins  
20 and unconverted paraffins, said branched  
21 olefins comprising 0.5% or less quaternary  
22 aliphatic carbon atoms;

23 contacting said branched olefins with an aromatic  
24 hydrocarbon in the presence of a quantity of an  
25 alkylation catalyst under alkylation conditions  
26 effective to alkylate said aromatic  
27 hydrocarbon, producing branched alkyl aromatic  
28 hydrocarbons comprising 0.5% or less quaternary  
29 aliphatic carbon atoms;

30 sulfonating said branched alkyl aromatic  
31 hydrocarbons.

1 133. The process of claim 132 wherein 0.3% or less  
2 of carbon atoms present in said isoparaffinic composition  
3 comprise quaternary aliphatic carbon atoms.

1 134. The process of claim 132 wherein said  
2 isoparaffinic composition is at least 50%w said branched  
3 paraffins.

1 135. The process of claim 132 wherein the said  
2 isoparaffinic composition is at most 5%w linear  
3 paraffins.

1 136. The process of claim 132 wherein said  
2 isoparaffinic composition is at most 1%w linear  
3 paraffins.

1 137. The process of claim 132 wherein said  
2 isoparaffinic composition is produced by a Fischer  
3 Tropsch process.

1 138. The process of claim 132 wherein said  
2 isoparaffinic composition is treated with an absorbent  
3 under absorbent conditions effective to perform a  
4 function selected from the group consisting of reducing

5 linear paraffin content, favorably adjusting said average  
6 number of branches, and a combination thereof.

1 139. The process of claim 132 wherein said  
2 dehydrogenation catalyst comprises a quantity of metal or  
3 metal compound selected from the group consisting of  
4 chrome oxide, iron oxide and, noble metals.

1 140. The process of claim 132 wherein said  
2 dehydrogenation catalyst comprises a quantity of noble  
3 metal selected from the group consisting of palladium and  
4 platinum.

1 141. The process of claim 133 wherein said  
2 dehydrogenation catalyst comprises a quantity of  
3 platinum.

1 142. The process of claim 139 wherein said  
2 dehydrogenation catalyst comprises a porous support  
3 selected from the group consisting of gamma alumina or  
4 eta alumina.

1 143. The process of claim 139 where said quantity of  
2 metal is from about 0.01 to about 5%w based on the weight  
3 of said dehydrogenation catalyst.

1 144. The process of claim 139 wherein said metal or  
2 metal compound is a noble metal and said dehydrogenation  
3 catalyst further comprises from about 0.01 to about 5%w  
4 of one or more metals selected from the group consisting  
5 of Group 3a, Group 4a and Group 5a of the Periodic Table  
6 of Elements.

1 145. The process of claim 139 wherein said metal or  
2 metal compound is a noble metal and said dehydrogenation  
3 catalyst further comprises from about 0.01 to about 5%w  
4 of one or more metals selected from the group consisting  
5 of alkali earth metals and alkaline earth metals.

1 146. The process of claim 139 wherein said metal or  
2 metal compound is a noble metal and said dehydrogenation

3 catalyst comprises from about 0.01 to about 5%w  
4 independently of tin and chlorine.

1 147. The process of claim 132 wherein said  
2 dehydrogenation catalyst is selected from the group  
3 consisting of chrome oxide on gamma alumina, platinum on  
4 gamma alumina, palladium on gamma alumina,  
5 platinum/lithium on gamma alumina, platinum/potassium on  
6 gamma alumina, platinum/tin on gamma alumina,  
7 platinum/tin on hydrotalcite, platinum/indium on gamma  
8 alumina and platinum/bismuth on gamma alumina.

1 148. The process of claim 132 wherein hydrogen and  
2 said isoparaffinic composition are fed to said  
3 dehydrogenation catalyst at a molar ratio of from about  
4 0.1 to about 20.

1 149. The process of claim 132 wherein said  
2 dehydrogenation conditions comprise a residence time  
3 effective to maintain a conversion level of said  
4 isoparaffinic composition below 50 mole%.

1 150. The process of claim 132 further comprising  
2 separating non-converted paraffins from said product and  
3 recycling said non-converted paraffins to said  
4 dehydrogenation catalyst.

1 151. The process of claim 132 wherein said process  
2 produces a product comprising from about 5 to about 30%  
3 mole olefins relative to the total number of moles of  
4 olefins and paraffins in said product.

1 152. A branched olefin composition made by the  
2 process of claim 1.

1 153. A branched alkyl aromatic hydrocarbon  
2 composition made by the process of claim 47.

1 154. A (branched-alkyl)arylsulfonate composition  
2 made by the process of claim 132.